ELECTRICAL HYPERSENSITIVITY

HUMAN STUDIES IN THE UK

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STUDIES

1. A case control study of brain tumours and acoustic neuromas in relation to the use of mobile phones

2. UK case-control study of adult brain tumours

3. A cohort study of mobile phone users (pilot)

STUDIES 4 - 7

4. A case study of leukaemia in relation to use of mobile phones
5. Case-control study of cancer incidence in early childhood and proximity to mobile base stations
6. Mobile cellular communication and cognitive functioning
7. The effects of mobile phone radiation on blood pressure

STUDIES 8 & 9

8. A study to evaluate the effects of mobile telephone usage on labyrinthine function

9. The effects of mobile phone use on symptoms and neuroendocrine function in ‘normal’ and ‘hypersensitive’ users.

KING'S COLLEGE GROUP

- Dr James Rubin
- Dr Anthony Cleare
- Professor Simon Wessely

- Mobile Phone Research Unit
- King's College, London

A DOUBLE BLIND EXPERIMENTAL PROVOCATION STUDY :

- GMS/RF Exposure
- Continuous wave RF exposure
- Sham exposure

OUTCOME MEASURES

- Self-reported symptom severity
- Plasma levels of neuroendocrine hormones

33 SUBJECTS REPORTED IN MORE THAN 50% OF MOBILE PHONE CALLS:

Headaches	85%
Dizziness	27%
Fatigue	24%
Nausea	15%
Itching	15%
Redness	9%
Burning	61%
Cognitive problems	42%

SYMPTOMS PERSISTED AFTER THE END OF THE CALL FOR:

- 2 Hours or less 64%
- More than 2 hours 36%
- 67% of patients had sought treatment for their sensitivity

PERCENTAGES OF PATIENTS WITH SYMPTOMS FROM:

- Phone masts 18%
- DECT phones 36%
- Landline phones 6%
- VDUs 27%
- TVs 12%
- Fluorescent lights 18%

OTHER CONDITIONS

- Chronic fatigue syndrome 3%
- Multiple chemical sensitivity 9%
- Electromagnetic fields 24%

REPORTED AWARENESS

- 0 complete guess
- 100 completely certain

- 82% reported a certainty of 50 or more

STUDIES 10 & 11

10. Conversations in cars: the relative hazards of mobile phones

11. The effects of radiofrequency radiation on brain physiology and function

STUDIES 12 - 15

12 Cellular and sub-cellular effects of microwave radiation in simple model organisms

13 The effect of pulsed radiofrequency electromagnetic fields on redox signalling and calcium homeostasis.

14 Measurement of the dielectric properties of biological tissue in vivo at microwave frequencies

15 The interaction of emerging mobile telecommunications systems with the human body

STUDIES 16, 17, 18

16 The assessment of the SAR in the head from TETRA handsets.

17 Traceability for mobile telecommunications and health research in the UK.

18 Hypersensitivity Symptoms associated with electromagnetic field exposure

HYPERSENSITIVITY SYMPTOMS ASSOCIATED WITH ELECTROMAGNETIC FIELD EXPOSURE

Prof Elaine Fox et al, University of Essex

1. Questionnaire (EHS Symptoms Scale)
2. 132 cases and 132 controls tested for psychological, physiological and health measures

STUDIES 19, 20, 21

19 Communicating uncertainty: mobile telecommunication health risks

20 Gene expression and metabolic profiles in volunteers exposed to a power frequency EMF.

21 The repair of gamma-ray induced chromosomal damage in human lymphocytes after exposure to extremely low frequency EMF.

LABYRINTHINE EFFECTS OF MOBILE TELEPHONE STIMULATION

Robin Cox
Doris-Eva Bamiou
Borka Ceranic
Phil Chadwick
Linda M. Luxon

SYMPTOMS

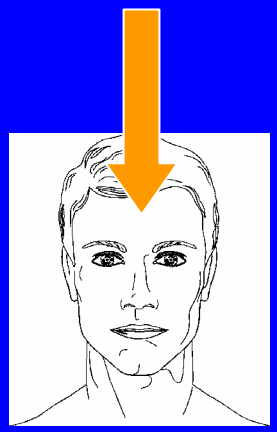
- Headaches
- Nausea
- Muzziness
- Disorientation
- Pain or “blockage” deep in the ear

SUBJECTS

- 51 subjects, 25 cases, 26 controls selected
- 11 dropped out leaving 19 cases and 21 controls

SITE OF HEADACHES

1



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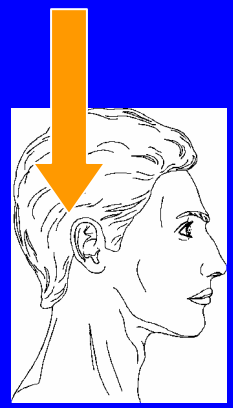

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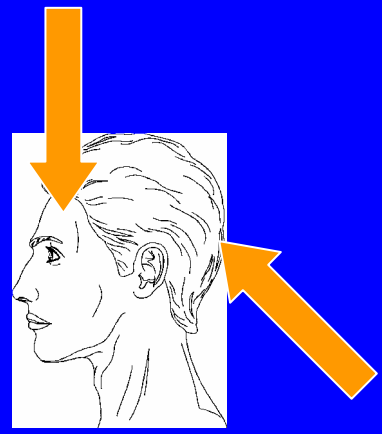

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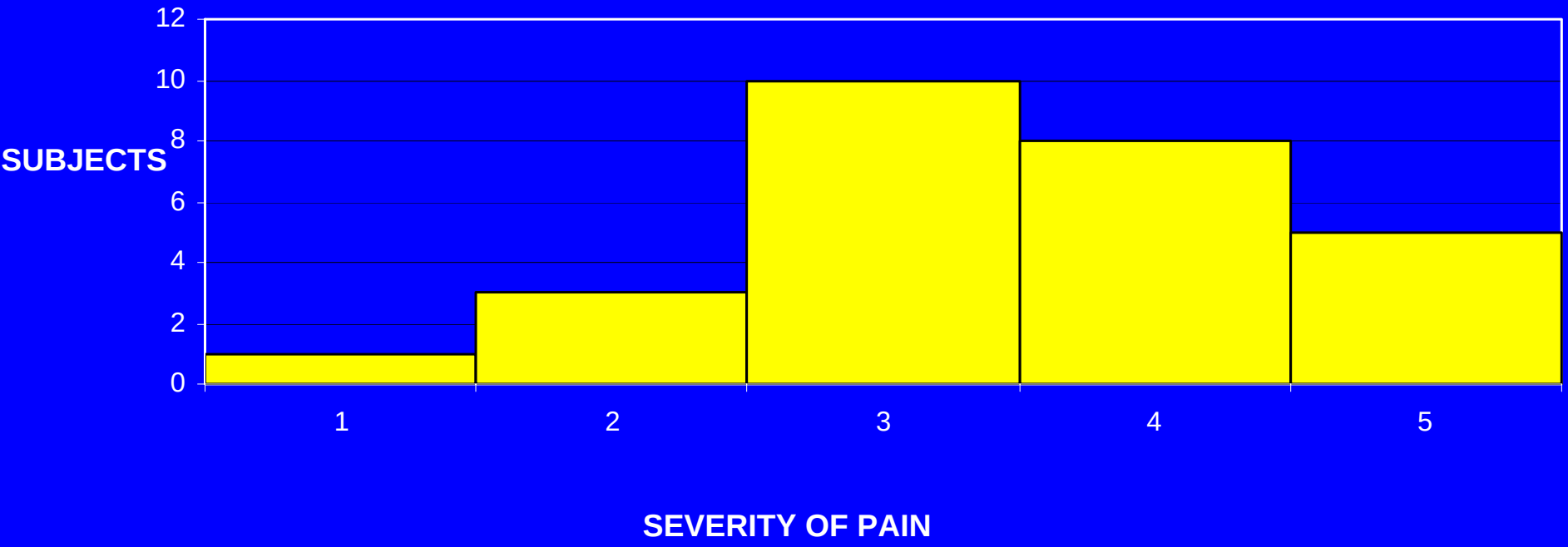
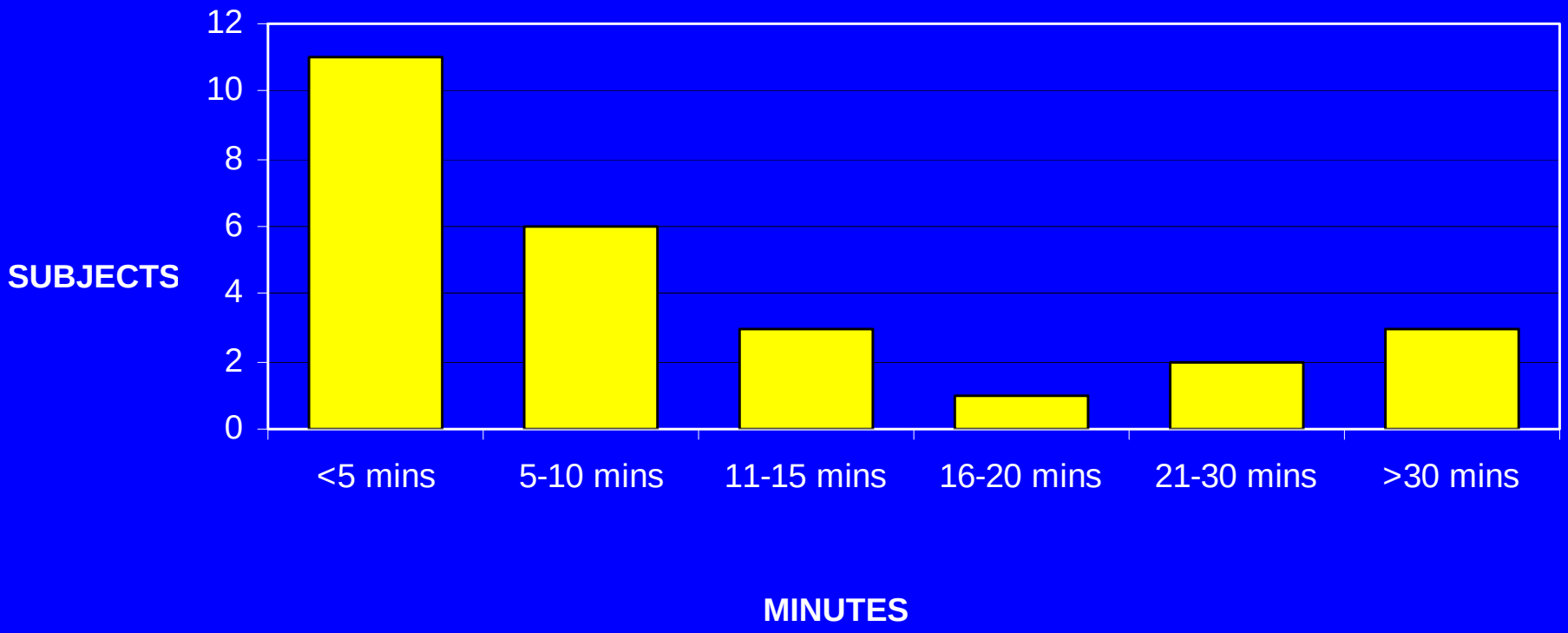
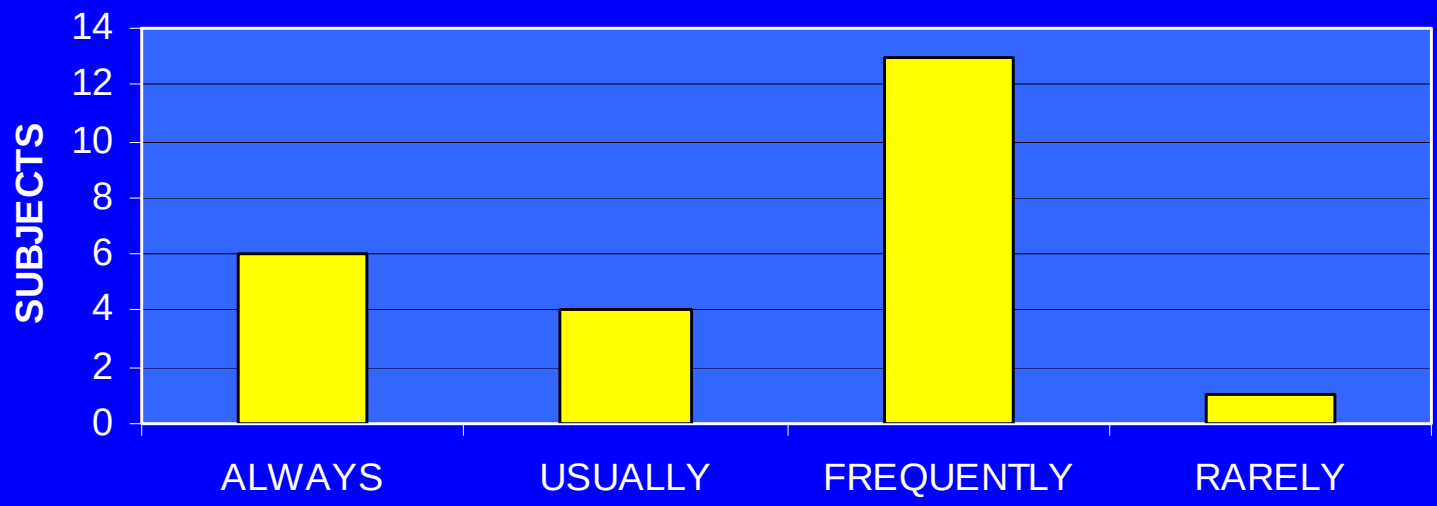
SEVERITY



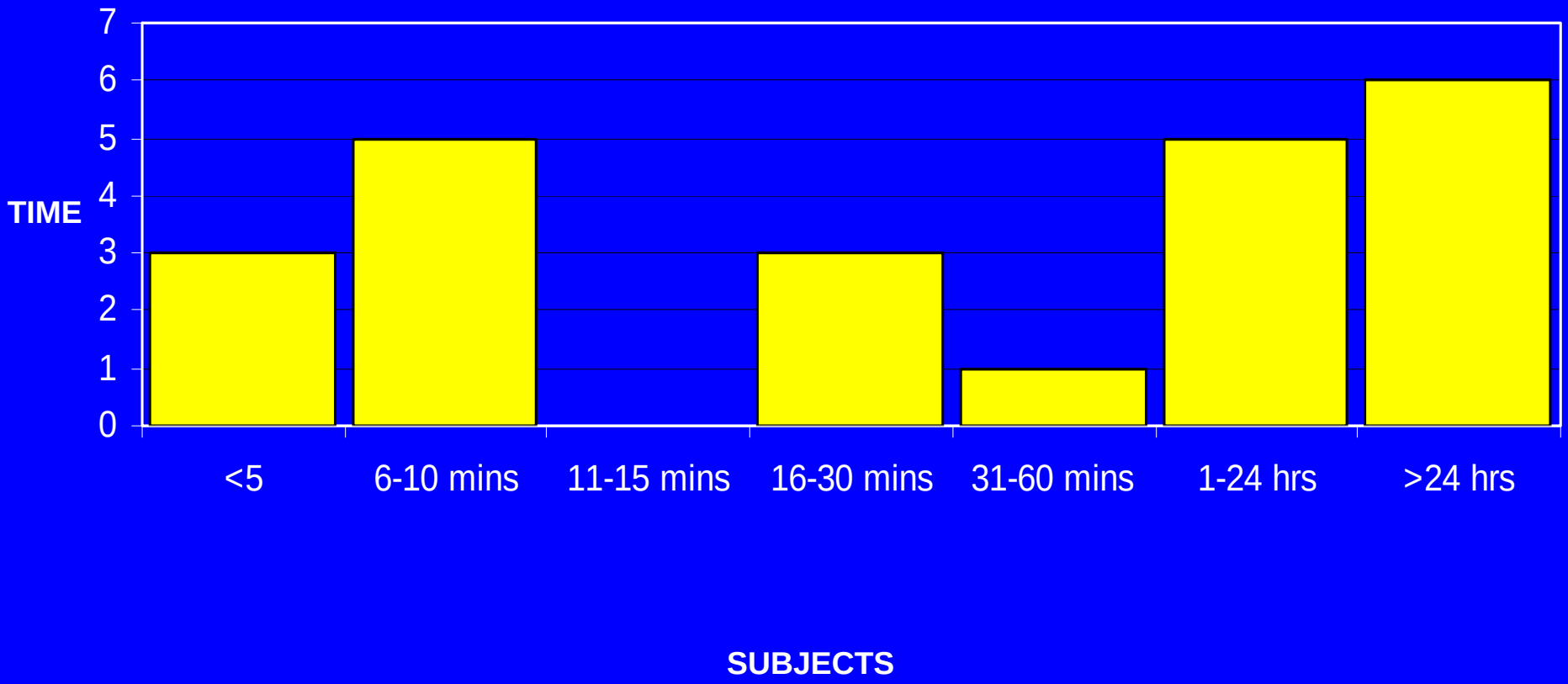
DELAY


12
10
8
6
4
2
0
SUBJECTS
<5 mins
5-10 mins
11-15 mins
16-20 mins
21-30 mins
>30 mins
MINUTES

FREQUENCY



PERSISTENCE



HEADACHES

- One subject got headaches using a land line phone
- 22 did not

- 14 subjects took analgesics
- 11 did not

- All subjects described the headaches as being different from any other they had experienced

OTHER SYMPTOMS

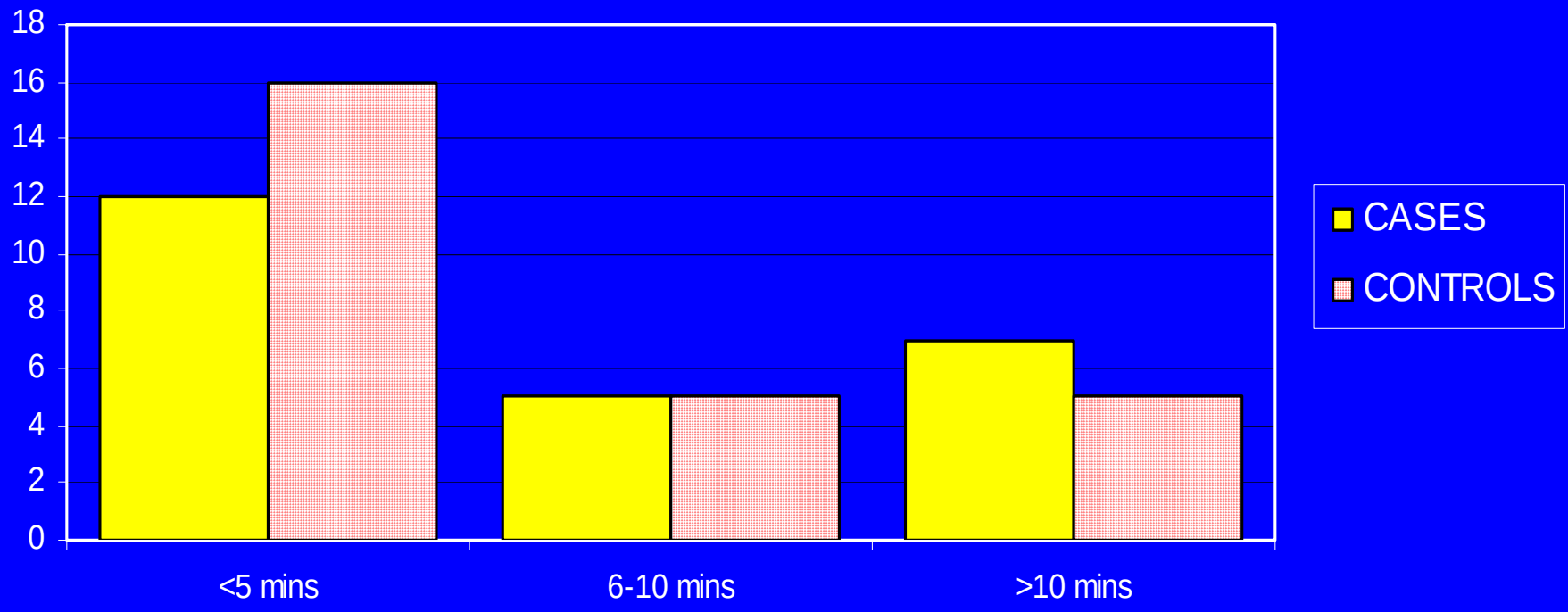
	YES	NO
• Nausea	14	11
• Muzziness/disorientation	17	8
• Other symptoms	9	16

SYMPTOMS

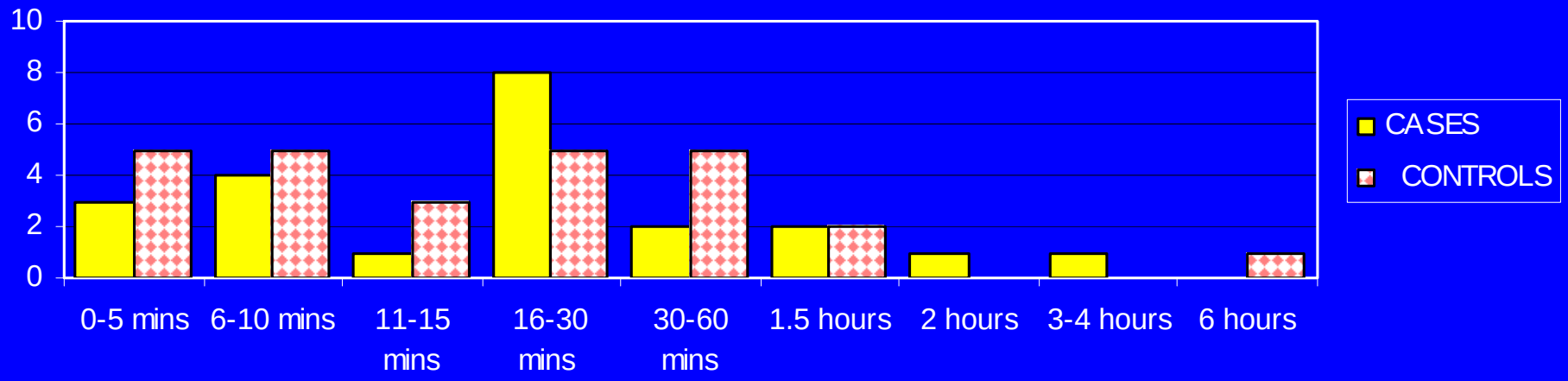
- 19 out of 20 subjects had experienced symptoms more than 20 times

- 3 out of 22 subjects got symptoms without the use of a mobile phone

LENGTH OF CALLS



LONGEST CALLS



PROTOCOL

- Double blind study: controls versus subjects
- Symptom and medical questionnaire
- Baseline tests: PTA, TEOAE, VOG, SVV/H
- Random exposures using generic device: 1 sham, 1 pulsed, 1 continuous = 3 for each ear
- SVV/H at 25th min of each exposure, TEOAE or VOG (separate sessions) after each exposure
- Ask subject: is device on or off?

- **Total exposure + testing time without breaks: 4 hours X 2** (TEOAEs and VOG recorded in separate sessions)

SUBJECTS AND CONTROLS

	Male	Female	Total
Subject	6	3	21
Control	12	9	9
Total	18	12	30

Median age: Cases – 35 yrs Controls – 33 yrs
Average age: Cases – 36.7 yrs Controls – 34.7 yrs

BASELINE TEOAE's AMPLITUDE IN SUBJECTS AND CONTROLS

TEOAEs	Mean	SD	T- test p value
R baseline-Subjects	12.3	7.7	.631
R baseline-Controls	13.5	5.3	
L baseline-Subjects	11	7.3	.462
L baseline-Controls	12.9	5.6	

GROUP DATA OF PAIRED T-TEST OF TEOAE's AMPLITUDE (BASELINE TO SHAM, CW, GSM)

TEOAE change	Mean	SD	Paired t-test p value
R B-sham	-.317	1.7	.331
R B-CW	-.086	2.2	.838
R B- GSM	-.630	2.2	.131
L B-sham	-.321	2.8	.551
L B-CW	-.546	2.2	.221
L B- GSM	-.074	2.2	.865

SUBJECTS VERSUS CONTROLS

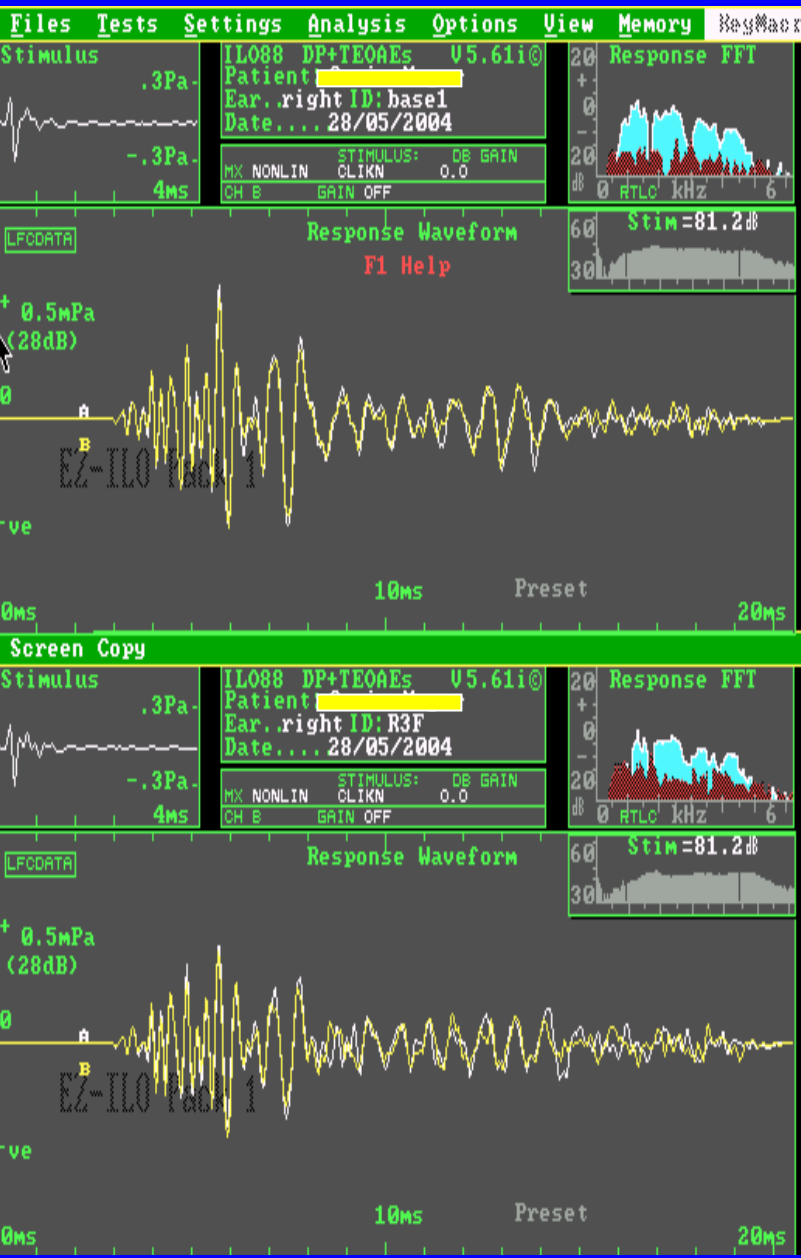
- There was no significant difference between subjects and controls in the change of the TEOAE amplitude:
  - 1. From baseline to sham exposure
  - 2. From baseline to CW exposure
  - 3. From baseline to GSM exposure

  (P>0.05)

Baseline

Symptomatic subject

CW



Sham

GSM